DOCUMENT RESUME

ED 295 506 HE 020 923

AUTHOR Skelton, W. Keith; And Others
TITLE 1985 Salaries: Society Membership Survey. American Institute of Physics Report.
INSTITUTION American Inst. of Physics, New York, NY. Education and Employment Statistics Div.
REPORT NO AIP-R-311-02; ISBN-0-88318-551-2
PUB DATE Oct 87
NOTE 57p.
AVAILABLE FROM American Institute of Physics, Education and Employment Statistics Division, 335 East 45th Street, New York, NY 10017.
PUB TYPE Statistical Data (110) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS *College Graduates; Comparative Analysis; *Employment Patterns; Females; Geographic Regions; Higher Education; Income; Males; *Physics; Professional Associations; *Salaries; *Scientists

ABSTRACT

Variation in the salaries of U.S. and Canadian members of the American Institute of Physics are examined, based on a spring 1985 survey. Graphics highlighting some of the patterns are presented, along with detailed tables and brief summary text. The overall response rate was 65%. Tables cover salaries and geographic location for Ph.D.s salaries and employment type for Ph.D.s, salaries and employment type for bachelor's and master's degrees, salaries and primary work activity, and salaries by sex. These data cover type of employer, type of work, position, and years from degree. Analyses center on median and quartile salaries. The tables also present for comparison the salary means, standard deviations, and median ages of each group. Information on salary changes between 1983 and 1985 is included. The most typical comparisons are cross-sectional, by which the 1985 median salary of industrially employed Ph.D.s are compared to the median salary of similarly employed individuals in 1983. In addition, longitudinal data, which looks at the same people at two or more points in time, provides a better picture of these actual increases. Technical notes are included. (SW)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

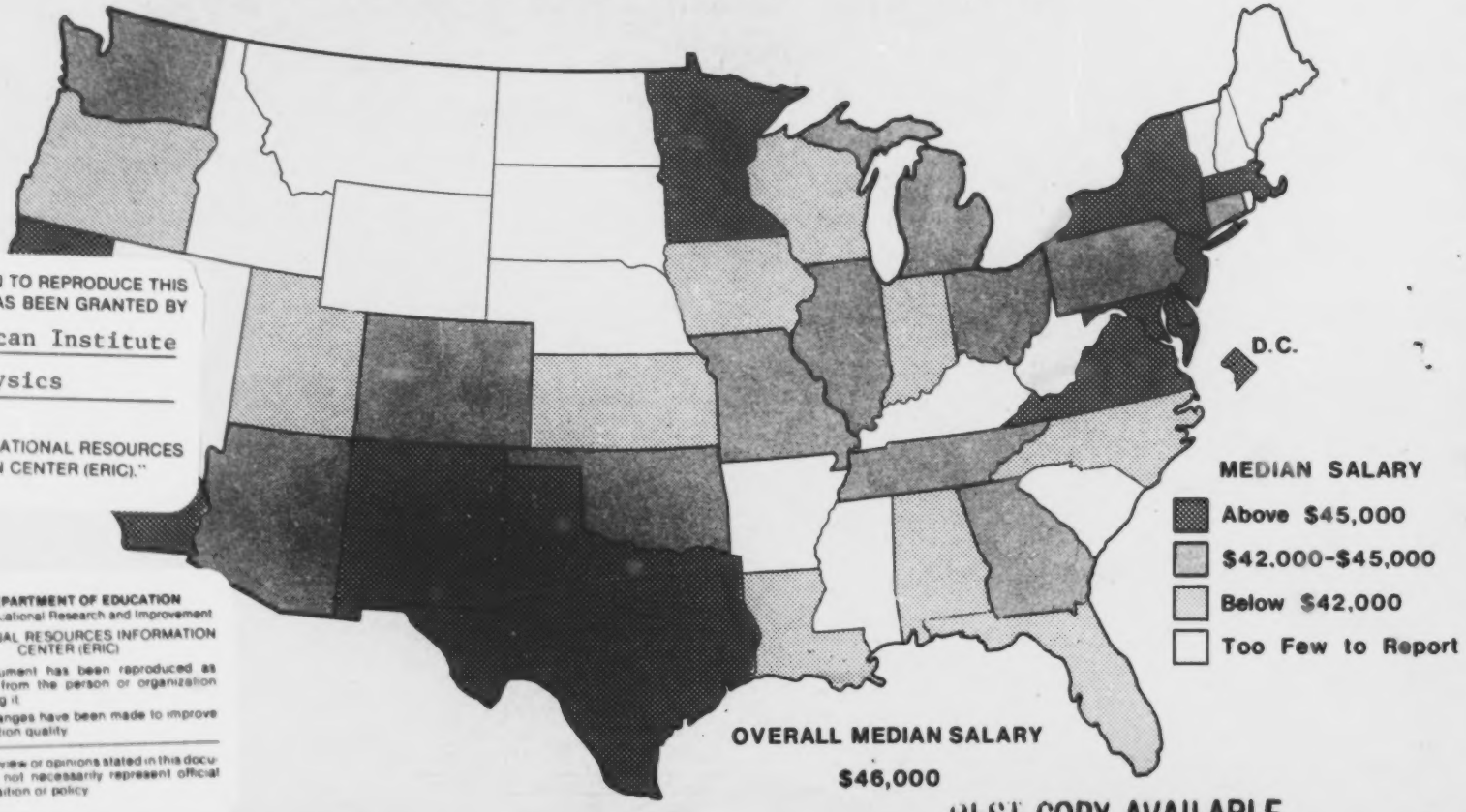
ED295506
AIP
HE 020 923

report

EDUCATION AND EMPLOYMENT
STATISTICS DIVISION

American Institute of Physics, 335 East 45 Street, New York, N.Y. 10017 (212) 661-9404

1985 SALARIES:
SOCIETY MEMBERSHIP SURVEY



"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
American Institute of Physics
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

BEST COPY AVAILABLE

THE AMERICAN INSTITUTE OF PHYSICS

The American Institute of Physics is a not-for-profit membership corporation chartered in New York State in 1931 for the purpose of promoting the advancement and diffusion of knowledge in physics and its application to human welfare. Leading societies in the fields of physics and astronomy are its members. AIP's activities include providing services to its ten Member Societies in publishing, finance, and educational programs.

Member Societies arrange for scientific meetings at which information on the latest advances in physics is exchanged. They also ensure that high standards are maintained in the publication of the results of scientific research. AIP has general responsibility for the publication and distribution of journals. The Institute is expected to stay in the forefront of publishing technology and to ensure that the services it performs for its Member Societies are efficient, reliable, and economical.

The Institute publishes its own scientific journals as well as those of its Member Societies; publishes both technical and general interest books; provides abstracting and indexing services; serves the public by making available to the press and other channels of public information reliable communications on physics and astronomy; collects and analyzes statistics on the profession and on physics education; encourages and assists in the documentation and study of the history and philosophy of physics; cooperates with local, national, and international organizations devoted to physics and related sciences; and collects and analyzes information on Federal programs and budgets.

The scientists represented by the Institute through its Member Societies number approximately 86,000. In addition, approximately 7,000 students in over 525 colleges and universities are members of the Institute's Society of Physics Students, which includes the honor society, Sigma Pi Sigma. Industry is represented through some 110 Corporate Associate members. AIP's monthly magazine, PHYSICS TODAY, reaches all these people and organizations.

The Education and Employment Statistics Division provides reliable information on the composition and dynamics of the scientific labor force and education system to the physics community for use in self-assessment. Its program involves regular data collection and analysis, information dissemination, and report publication.

MEMBER SOCIETIES

The American Physical Society
Optical Society of America
Acoustical Society of America
The Society of Rheology
American Association of Physics Teachers
American Crystallographic Association
American Astronomical Society
American Association of Physicists in Medicine
American Vacuum Society
American Geophysical Union

AIP OFFICERS

Hans Frauenfelder, Chair, Governing Board
Kenneth Ford, Executive Director and CEO
Roderick M. Grant, Secretary
Gerald F. Gilbert, Treasurer
Robert H. Marks, Director for Publishing
John S. Rigden, Director of Physics Programs

EDUCATION AND EMPLOYMENT STATISTICS DIVISION

Beverly Fearn Porter, Manager

OTHER STATISTICS DIVISION REPORTS

Graduate Student Survey
Employment Survey
Enrollments and Degrees
Physics and Astronomy Bachelor's Degree Recipients
AIP Member Societies Entering the 1980's
Society Membership 1980 Profile: Stability and Change
Society Membership 1981 Profile: An Expanded View
Society Membership Profile: The Pattern of Subfield Associations
1982 Salaries: Society Membership Survey
1983 Salaries: Society Membership Survey

1985 SALARIES:

SOCIETY MEMBERSHIP SURVEY

W. Keith Skelton, Roman Czujko, and Dawn Kellman

The American Physical Society
Optical Society of America
Acoustical Society of America
The Society of Rheology
American Association of Physics Teachers
American Crystallographic Association
American Astronomical Society
American Association of Physicists in Medicine
American Vacuum Society
American Geophysical Union

COVER

This figure illustrates the variation in median salaries by state of residence. California and several states in the sunbelt and along the eastern coast maintain the greatest concentration of society members and the highest PhD salaries in the nation. Heavy representation of industry, government, and national laboratories within these states, and the higher salaries associated with such employment, account for the salary distribution found within these areas. States where relatively low salaries are observed (the Plains and Southeastern states) generally have relatively few society members, most of whom are academically employed. Where shading is absent, there are too few society members to report reliable median salaries.

Median salaries for PhD society members resident in the Canadian provinces of Quebec and Ontario in the accompanying figure are presented in Canadian dollars. The salaries in Quebec are lower, partly reflecting the heavier academic composition of the members residing there.

Copyright © 1987 American Institute of Physics

All rights reserved. No part of this publication may be reproduced without prior written permission of the publisher.

International Standard Book Number: 0-88318-551-2
AIP Publication Number: R-311.02 October 1987

Distributed by
Education and Employment Statistics Division
American Institute of Physics
335 East 45th Street
New York, New York 10017
(212) 661-9404

Printed in the United States of America

Price: single copies free; multiple copies on request

TABLE OF CONTENTS

	Page
INTRODUCTION (Figure 1)	1
SALARIES AND GEOGRAPHIC LOCATION FOR PhDs (Figures 2–3)	2
Table 1. 1985 salaries by geographic division, PhDs.	
Table 2. 1985 reported salaries, adjusted salaries and employment sector distribution by geographic division, PhDs.	
Table 3. 1983 and 1985 salaries by geographic division, PhDs.	
Table 4. 1985 salaries and employment sector distribution for selected states and Canadian provinces, PhDs.	
Table 5. 1985 median salaries adjusted for cost of living in selected metropolitan areas, PhDs.	
SALARIES AND EMPLOYMENT SECTOR FOR PhDs (Figures 4–12)	7
Table 6. 1985 salaries by major employment sector, PhDs.	
Table 7. 1985 salaries by years from degree, PhDs.	
Table 8. 1985 industrial salary structure by years from degree, PhDs.	
Table 9. 1985 government salary structure by years from degree, PhDs.	
Table 10. 1985 FFR&DC salary structure by years from degree, PhDs.	
Table 11. 1985 university 11–12 month salary structure by years from degree, PhDs.	
Table 12. 1985 university 9–10 month salary structure by years from degree, PhDs.	
Table 13. 1985 university salaries by selected academic rank and salary base, PhDs.	
Table 14. 1985 4-year college salaries by selected academic rank on 9–10 month salary base, PhDs.	
Table 15. 1983 and 1985 salaries for members continuing with the same employer within selected employment sectors, PhDs.	
Table 16. 1983 and 1985 salaries for members continuing to work in the same university by academic rank, PhDs.	
Table 17. 1983 and 1985 salaries for members who changed employers during the two years, PhDs.	
SALARIES FOR MASTERS AND BACHELORS (Figures 13–15)	18
Table 18. 1985 salaries by selected employment sector, Masters.	
Table 19. 1985 salaries by selected employment sector and years from degree, Masters.	
Table 20. 1985 industrial salaries by years from degree, Bachelors.	
Table 21. 1983 and 1985 salaries for members continuing with the same employer within selected employment sectors, Masters and Bachelors.	
SALARIES AND PRIMARY WORK ACTIVITY (Figure 16)	23
Table 22. 1985 industrial salaries by primary work activity and years from degree, PhDs.	
Table 23. 1983 and 1985 salaries for members continuing in the same primary work activity, PhDs.	
Table 24. 1983 and 1985 salaries for members continuing in the same primary work activity, Masters.	
Table 25. 1983 and 1985 salaries for members continuing in the same primary work activity, Bachelors.	
SALARIES FOR MALES AND FEMALES	26
Table 26. 1985 industrial salaries by sex and years from degree.	
Table 27. 1983 and 1985 salaries by sex and major employment sector.	
APPENDICES: GEOGRAPHIC DIVISIONS AND TECHNICAL NOTES	27

INTRODUCTION

Between March 1983 and March 1985 the salaries of society members kept slightly ahead of the national inflation rate.[1] Median salaries for members increased to $44,100 from the $40,000 observed in 1983, an average increase of 5.0% per year. PhDs, who make up nearly three quarters of the full-time employed membership, earned a median salary of $46,000 while individuals with masters or bachelors degrees made approximately $40,000.

The 1985 survey represents the seventh time that society members have been queried annually for demographic and employment information. Figure 1 illustrates that since 1979 society members have been struggling to keep pace with inflation. Median salaries for all full-time employed society members, adjusted to represent constant 1979 dollars, have increased only 5.1% over this six-year period. The majority of society members, those with doctoral degrees, have fared slightly better with an increase of 7.7%.

These are just a few of the findings derived from the Education and Employment Statistics Division's Membership Sample Survey, conducted in the spring of 1985. This report examines the considerable variation in salary levels and patterns of increase by geographic location, employer, type of work, position, degree level, years from degree, and sex. The data provided are based on a stratified random sample of over one-sixth of the United States and Canadian members. The individuals contacted were all current members of at least one AIP member society as of December 1984.[2] The overall response rate in 1985 was 65%.

The analyses for this report center around the use of median and quartile salaries, which are the preferred descriptive measures of central tendency and variations in typically skewed salary distributions. Mean salaries, standard deviations, and median ages for each group are presented in each table for comparative purposes. See Appendix B for definitions and technical notes on the measures used in this report.

While much of this report will detail the various salary structures found in March 1985, salary changes between 1983 and 1985 will also be examined. Such change can be analyzed in several ways. The most typical comparisons are cross-sectional, e.g., comparing the 1985 median salary of industrially employed PhDs to the median salary of similarly employed individuals in 1983. Cross-sectional analyses, as valuable as they are, reflect net changes; they do not examine the dynamics of salary change. For individual society members or employers seeking data on typical salary increases, they may be misleading. Longitudinal data, which look at the same people at two or more points in time, provide a better picture of these actual increases. In this report, we have presented or commented on both types of salary change where possible.

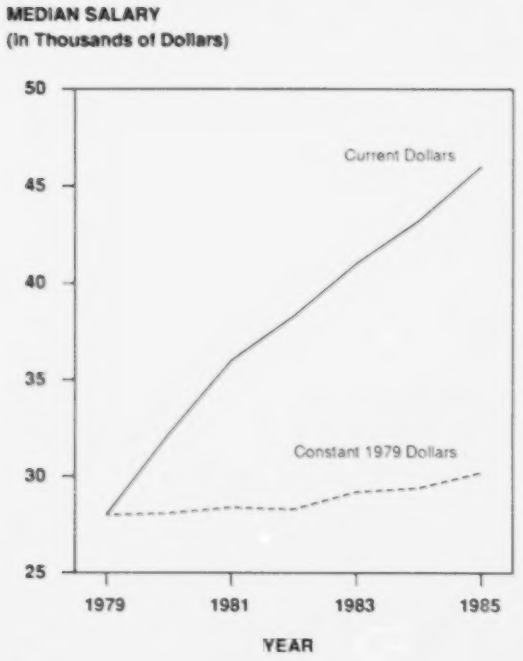


Figure 1. Median salaries for PhDs, 1979–1985. Both reported salaries and salaries adjusted for inflation are presented.

Readers should note that the small number of masters and bachelors in the sample limits the amount of detailed analysis that can be performed. Within this small group, nearly one out of every five masters degree holders work in secondary schools and two thirds of the bachelors are employed in industry. One reason for the limited representation of lower degree holders is that a large proportion of this group are advanced graduate students and thus are not included in traditional salary analyses. Many of the masters and bachelors who are not pursuing advanced degrees are employed as teachers,

[1] Between March 1983 and March 1985 the average rate of inflation, as quoted by the Bureau of Labor Statistics Consumer Price Index Division, was 4.2%.

[2] While the American Geophysical Union is now a member society of AIP, it was not at the time of this survey.

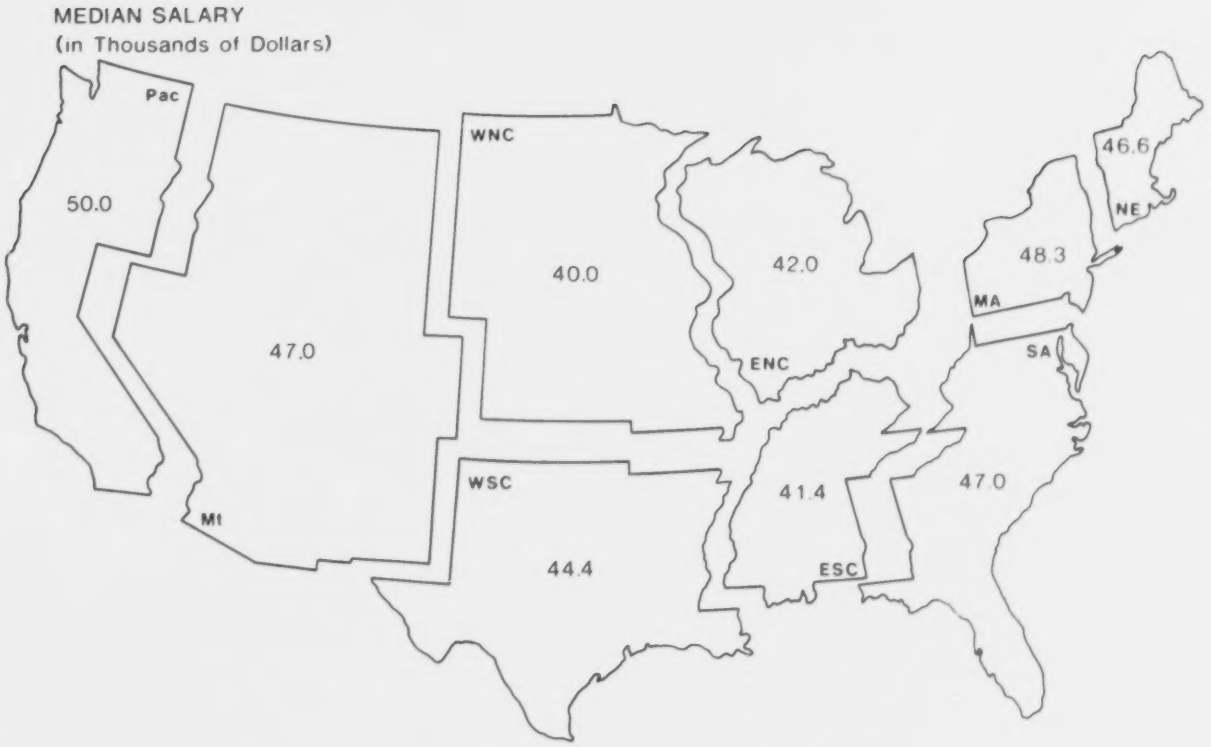


Figure 2. Variation in median salary for PhDs by geographic division, 1985.

engineers, skilled technicians, and administrators with special interests in specific society programs. As a result of this limited sample the bulk of this report focuses on those members holding doctoral degrees. Some limited discussion on lower degree holders can be found in the section pertaining to employment sector.

If further information is required about any portion of this report, the reader is urged to contact the Education and Employment Statistics Division at the American Institute of Physics.

SALARIES AND GEOGRAPHIC LOCATION FOR PhDs

• From one region of the country to the next, median salaries for industrially employed members are consistently higher than those in other employment sectors. Salary differences between academically employed society members and those working in industry represent the greatest disparity, with salary differences ranging from $11,000 in the Pacific to $17,000 in the Mountain states. In addition, academically employed members are 2 to 6 years older than those in industry. The distribution of states within each division can be found in Appendix A.

Table 1. 1985 salaries by geographic division, PhDs.[a]

	Median Salary	Mean Salary (in thousands of dollars)	Standard Deviation	Median Age	Total Number Known
New England	46.6	49.1	18.9	43	322
Middle Atlantic	48.3	50.0	20.3	44	728
South Atlantic	47.0	48.0	16.2	44	606
East North Central	42.0	44.8	18.3	45	466
East South Central	41.4	41.8	11.7	46	132
West North Central	40.0	40.9	14.2	44	147
West South Central	44.4	45.8	16.4	44	213
Mountain	47.0	48.6	17.0	44	351
Pacific	50.0	51.3	17.0	43	703
Canada[b]	49.7	49.8	16.0	44	154

[a] See Appendix A for state composition of each division.
[b] Canadian salaries are reported in Canadian dollars. One U.S. dollar = 1.38 Canadian dollars.

Table 2. 1985 reported salaries, adjusted salaries and employment sector distribution by geographic division, PhDs.[a]

	Academic			Industry			Other				
	Median Salary	Median Age	%	Median Salary	Median Age	%	Median Salary	Median Age	%	Mean Salary	Adjusted Mean Salary
New England	40.0	45	52	53.9	41	32	50.0	41	16	49.1	49.7
Middle Atlantic	40.0	46	44	54.0	42	44	49.6	44	12	50.0	48.7
South Atlantic	37.4	45	40	51.0	42	16	54.0	45	44	48.0	47.3
East North Central	37.0	47	60	49.9	41	21	47.7	44	19	44.8	46.6
East South Central	35.3	47	51	*	*	*	46.4	44	44	41.8	44.2
West North Central	35.0	45	70	50.0	40	25	*	*	*	40.9	44.4
West South Central	36.0	45	61	53.4	42	33	*	*	*	45.8	46.7
Mountain	36.0	45	36	53.0	43	14	51.8	43	50	48.7	47.7
Pacific	42.0	46	35	53.4	42	39	51.0	43	26	51.4	50.0
Overall	38.4	46	46	52.6	42	29	50.6	44	25	48.2	48.2

[a] Mean salaries for each division were statistically weighted to reflect an employment sector composition identical to that observed nationwide.
**Number of respondents was too small to calculate reliable statistics.*

- Society members employed in the highly industrialized Pacific coast and Middle Atlantic states command the highest salaries in the nation, $50,000 and $48,300 respectively.

- More than fifty percent of the full-time employed society members living in the Central United States and New England work in the academic sector. The four divisions comprising the central states have the lowest PhD salaries in the nation, ranging from $40,000 to $44,400. New England maintains a relatively high overall salary due to the well paid academic and industrial members residing in and around the Boston area.

- The three main factors that dictate the salary levels found throughout the United States are (1) the distribution of employment sectors within each division, (2) the salary structure for each employer type, and (3) the inter-divisional age variations. In order to get an accurate picture of the effects of geographic location on salaries, independent of variations in employment sector, divisional mean salaries were statistically weighted to control for those dissimilarities.

Table 3. 1983 and 1985 salaries by geographic division, PhDs.

	Year	Median Salary	Mean Salary (in thousands of dollars)	Standard Deviation	Median Age in 1985	Total Number Known
New England	1983	42.0	42.9	13.8		
	1985	50.0	51.0	17.0	46	213
Middle Atlantic	1983	43.0	44.3	15.6		
	1985	50.0	51.8	19.0	45	508
South Atlantic	1983	42.0	43.2	13.5		
	1985	49.6	49.8	14.7	46	426
East North Central	1983	38.0	39.4	14.0		
	1985	44.1	46.8	18.6	47	330
East South Central	1983	36.7	36.7	9.6		
	1985	42.0	42.3	11.6	47	102
West North Central	1983	35.3	36.1	10.9		
	1985	42.0	42.4	13.7	45	105
West South Central	1983	40.0	41.4	14.6		
	1985	45.8	47.5	16.0	45	140
Mountain	1983	41.0	43.2	14.0		
	1985	50.0	51.4	17.2	45	232
Pacific	1983	43.7	45.3	13.0		
	1985	51.1	53.7	15.7	45	488

- After controlling on the different employer distributions in the various geographic divisions, the disparity in average salaries drops from $10,500 to $5,800. Some regional variation, however, continues to exist.

- Academically employed individuals living in the West North Central and the East South Central are the lowest paid PhDs in the nation with academic salaries more than $3,000 under the mean academic salary observed nation wide.

- The highest paid industrially and academically employed society members live in the Pacific, New England, and Middle Atlantic states. The academic mean salaries within these regions are $2,600 to $4,600 greater than any other division, thus producing the three highest overall mean salaries.

- During the two-year span between March 1983 and March 1985 salaries for PhDs who remained in one regional division increased between 14 and 22%, considerably above the 9% inflation rate observed for that period.

- Between 1983 and 1985 PhDs living in the East South Central and the West South Central received the smallest divisional salary increases in the nation. While small salary increases at the national laboratories accounted for the suppressed salaries in the East South Central, a struggling oil industry in Texas, Oklahoma and Louisiana dampened salaries in the West South Central.

- The cities included in Table 5 all volunteered to participate in a survey developed by the American Chamber of Commerce Researchers Association. The questionnaire was developed to "provide a useful and reasonably accurate measurement of inter-city cost of living differences." The cost of living index represents a market basket of goods and services for the first quarter of 1985. Certain cities (Chicago, Washington D.C., and San Francisco) are notably absent from the list due to a lack of response to the survey.

Table 4. 1985 salaries and employment sector distribution for selected states and Canadian provinces, PhDs.[a]

	Median Salary	Mean Salary (in thousands of dollars)	Standard Deviation	Median Age	Total Number Known	Academic %	Industry %	Gov't %	FFR&DC %	Other %
Alabama	41.0	41.0	10.5	47	24	68	4	24	–	4
Arizona	43.0	44.8	17.1	44	53	59	19	5	13	4
California	50.0	52.1	16.8	43	627	31	41	4	19	5
Northern	51.6	52.4	16.2	43	297	28	36	4	25	7
Southern	49.7	51.9	17.4	43	330	34	45	5	13	3
Colorado	43.2	47.1	18.6	44	92	47	25	17	10	1
Connecticut	45.0	48.1	21.5	43	72	51	39	4	–	6
Delaware	48.3	46.2	11.7	42	28	30	63	–	–	7
DC	54.8	54.3	14.0	46	153	5	2	88	–	5
Florida	40.5	42.9	15.4	46	49	65	22	8	–	5
Georgia	44.1	44.0	15.6	44	36	81	16	–	–	3
Illinois	43.0	46.5	19.0	44	161	52	14	–	30	4
Indiana	37.0	40.3	15.6	46	54	82	14	2	–	2
Iowa	37.0	38.9	13.2	44	27	88	3	–	7	2
Kansas	38.9	37.8	8.8	44	19	91	9	–	–	–
Louisiana	40.5	43.1	13.1	45	21	83	10	2	–	5
Maryland	46.4	47.9	14.8	42	159	33	22	39	2	4
Massachusetts	48.0	50.5	18.1	43	220	49	32	10	4	5
Michigan	43.8	45.7	18.1	46	87	60	33	1	–	6
Minnesota	46.4	46.1	16.1	42	44	40	56	–	–	4
Missouri	42.0	42.4	15.7	44	35	66	30	–	–	4
New Jersey	50.1	56.2	22.4	40	225	18	72	3	6	1
New Mexico	51.7	54.2	15.0	44	151	8	5	7	80	–
New York	47.5	48.5	18.8	45	341	53	32	2	8	5
Northern	47.0	48.6	20.0	45	179	57	37	2	2	2
Southern	48.0	48.3	17.4	45	162	49	27	1	15	8
North Carolina	37.0	42.6	19.9	45	49	88	6	2	–	4
Ohio	44.0	45.8	19.0	45	113	53	29	10	4	4
Oklahoma	42.2	45.1	17.8	43	21	59	39	–	–	2
Oregon	35.2	40.4	19.1	46	23	67	29	–	–	4
Pennsylvania	42.5	44.3	18.0	44	161	63	27	4	–	6
Tennessee	43.6	42.9	11.4	44	87	38	7	–	54	1
Texas	46.0	47.0	16.7	43	160	56	38	1	–	5
Utah	38.0	39.4	15.0	44	24	90	8	–	–	2
Virginia	49.5	49.6	17.7	45	99	46	22	20	6	6
Washington	43.0	45.0	15.9	43	42	62	33	–	5	–
Wisconsin	35.4	39.8	16.0	43	50	79	17	1	–	3
Ontario[b]	49.7	48.9	13.9	44	69	56	14	29	–	1
Quebec	44.7	49.4	17.7	44	27	82	14	–	–	4

[a] Several states were not included above because the number of respondents was too small to calculate reliable statistics.
[b] Canadian salaries are reported in Canadian dollars. One U.S. dollar = 1.38 Canadian dollars.

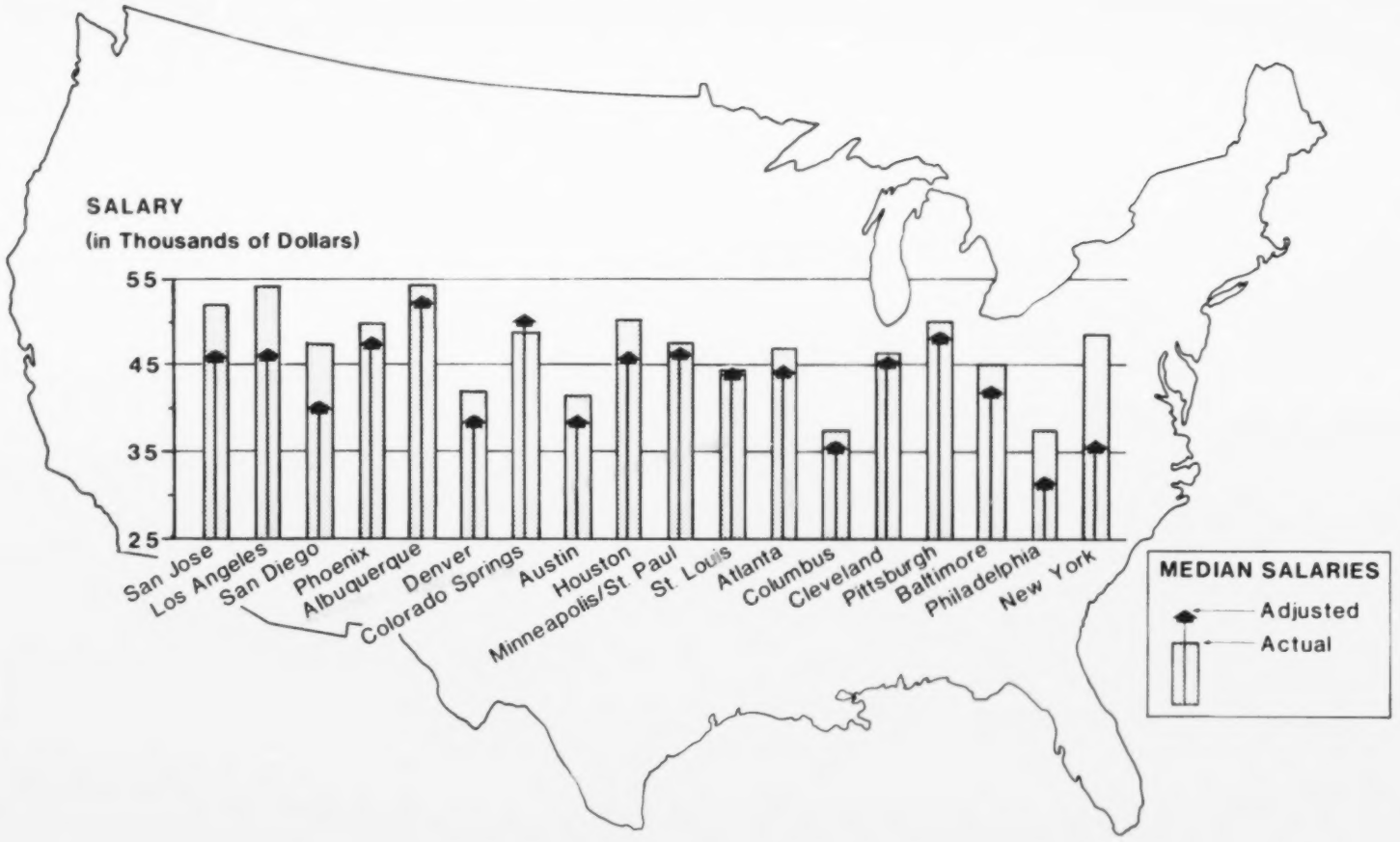


Figure 3. Median salaries for PhDs in 18 metropolitan areas, 1985. Both actual salaries and salaries adjusted for cost of living are presented.

• There is a direct relationship between the size of a metropolitan area and the cost of living. In general, society members tend to reside in larger, more expensive urban centers. As a consequence, only two cities listed in Table 5, Colorado Springs and St. Louis, have a lower cost of living index than the national average (100).

• PhD society members living in the New York metropolitan area have a median salary $2,000 above the national. While this initially appears attractive, one must consider that New York is one of the most expensive cities in the continental United States. Members making the $49,000 median salary in New York earn an adjusted salary nearly $10,000 less than the national median. In addition society members in New York are, in general, older than colleagues in other cities.

Table 5. 1985 median salaries adjusted for cost of living in selected metropolitan areas, PhDs.[a]

	Cost of Living Index	Median Salary	Adjusted Salary	Median Age	Academic %	Non-Academic %	Total Number Known
Albuquerque	102.3	54.0	52.8	42	15	85	52
Atlanta	103.8	46.8	45.1	42	76	24	29
Austin	105.5	41.5	39.3	43	77	23	30
Baltimore	105.0	45.0	42.8	42	51	49	36
Cleveland	101.4	46.0	45.4	38	27	73	26
Colorado Springs	96.5	48.8	50.6	43	29	71	19
Columbus	102.8	37.1	36.1	46	80	20	30
Denver	107.0	42.0	39.2	43	51	49	20
Houston	109.0	50.1	46.0	43	54	46	50
Los Angeles	116.6	54.0	46.3	44	29	71	124
Minneapolis/St. Paul	101.4	47.5	46.8	41	37	63	41
New York	134.4	49.0	36.4	46	55	45	120
Philadelphia	114.6	37.0	32.3	42	69	31	45
Phoenix	104.7	50.0	47.8	40	52	48	20
Pittsburgh	102.9	50.0	48.6	47	45	55	50
St. Louis	99.8	44.4	44.5	42	48	52	22
San Diego	116.4	47.2	40.5	45	29	71	53
San Jose	112.1	52.0	46.4	40	29	71	38

[a] Cost of Living Index from the American Chamber of Commerce Researchers Association, national average = 100.0

$$\textit{Adjusted salary} = \frac{\textit{Median Salary}}{\textit{cost of living \%}}$$

• Individuals residing in Philadelphia, Los Angeles, San Diego, and San Jose are also hit hard by the cost of living. While members living in the California cities are mainly employed in industry and thus have median salaries above the national median prior to adjusting, Philadelphia's unweighted salary starts $9,000 below the national median. Consequently members in Philadelphia have the lowest adjusted median salary.

• Albuquerque, New Mexico and Colorado Springs, Colorado are the only cities listed that maintain median salaries over $50,000 after adjusting for the cost of living. Albuquerque has the lowest proportion of academically employed members of all the cities listed while members living in Colorado Springs enjoy a relatively low cost of living, thus accounting for the high median salaries.

SALARIES AND EMPLOYMENT SECTOR FOR PhDs

• In 1985, the median salary reported by society members with PhDs rose to $46,000. This represents an increase of 6.5% from the previous year, substantially greater than the 3.7% rate of inflation observed during this period.

• Starting salaries (see median salaries, 0–4 years from degree) are highest in industry, followed by government and national laboratories, and then universities. Government starting salaries, traditionally somewhat lower than those in national laboratories, increased rapidly over the year and are now in line with those at the national laboratories.

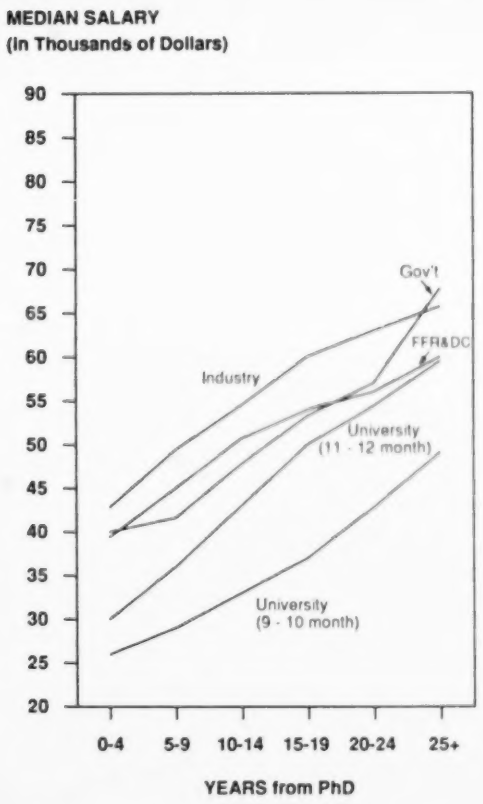


Figure 4. Median salaries by type of employer and years from PhD, 1985.

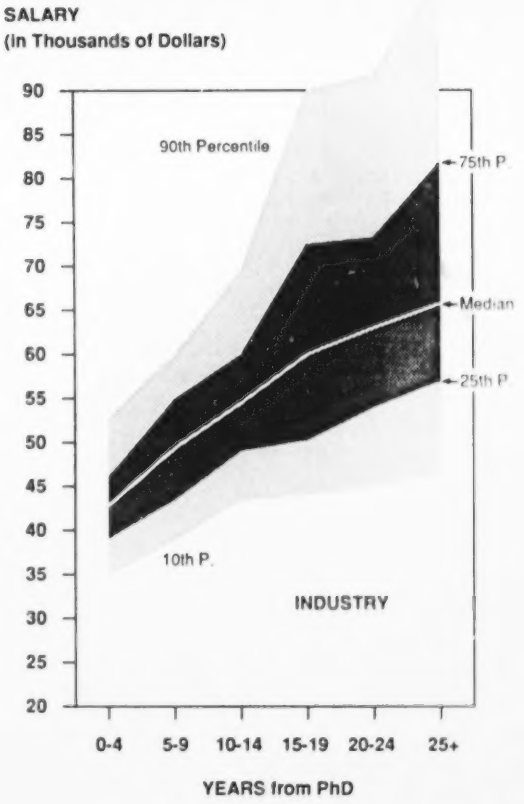


Figure 5. Salary structure in industry by years from PhD, 1985.

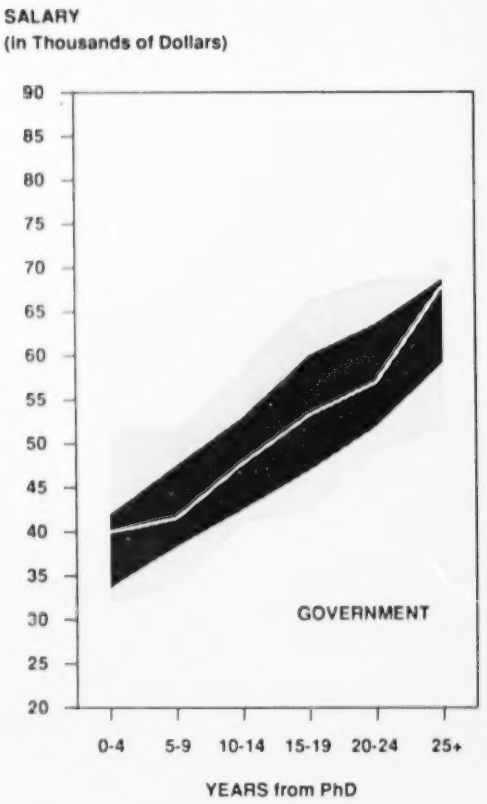


Figure 6. Salary structure in government by years from PhD, 1985.

• Industrially employed PhDs commanded the highest median salaries, $52,600. Those employed in government or national laboratories earned somewhat less, $51,000 and $50,600, respectively. In general, scientists employed in universities and four-year colleges reported lower salaries than their non-academic peers. Those employed in universities on an 11–12 month salary base, for example, earned a median salary of close to $43,000, highest within the academic sphere yet well below the overall median salary.

• Although percentage increases in salary levels across all employment sectors remained comfortably ahead of inflation, those observed in academe were the largest. Between 1983 and 1985, median industrial salaries increased approximately 5% per year and median government salaries rose somewhat faster at 6%. During this same period, salaries in universities and four-year colleges climbed by roughly 7%. Despite these increases, median salaries of university-employed scientists remain lower than those employed in non-academic spheres.

Table 6. 1985 salaries by major employment sector type, PhDs.

	Median Salary	Mean Salary	Standard Deviation	Median Age	Total Number Known
	(in thousands of dollars)				
University					
9–10 Month Salary	39.0	41.2	12.7	48	823
11–12 Month Salary	42.7	43.8	17.8	42	545
4-Year Colleges					
9–10 Month Salary	30.0	30.8	7.8	45	150
Industry/Self-Employed	52.6	57.0	19.5	42	1045
Government	51.0	51.5	12.3	45	349
FFR&DC	50.6	51.8	13.7	43	427
Nonprofit	48.0	49.6	19.2	4	86
Hospital	52.1	55.1	21.3		47

Table 7. 1985 salaries by years from degree, PhDs.

Years from Degree	Median Salary	Mean Salary	Standard Deviation	Median Age	Total Number Known
	(in thousands of dollars)				
0–4	33.0	33.7	11.6	32	539
5–9	42.0	42.2	12.4	36	622
10–14	47.4	47.3	13.9	41	644
15–19	50.0	50.9	18.2	45	693
20–24	52.0	52.9	15.6	50	471
25–29	55.0	57.7	19.3	55	317
30 +	60.0	61.0	20.9	61	373

Table 8. 1985 industrial salary structure by years from degree, PhDs.[a]

Years from Degree	PERCENTILE SALARIES 10th	25th	Median	75th	90th	Mean Salary	Standard Deviation	Median Age	Total Number Known
			(in thousands of dollars)						
0–4	35.0	39.1	42.8	46.1	52.9	43.6	8.7	32	175
5–9	39.0	43.5	49.4	55.0	60.0	50.1	9.8	36	236
10–14	43.4	49.1	54.5	60.0	69.6	56.0	12.1	41	196
15–19	44.0	50.3	60.0	72.5	90.0	64.0	21.7	45	179
20–24	45.0	54.0	63.0	73.3	91.8	66.1	19.4	50	92
25 +	46.3	57.0	65.7	81.8	103.0	72.3	27.5	59	152

[a] In addition, there were 9 postdoctorates with a median salary of $34,700.

Table 9. 1985 government salary structure by years from degree, PhDs.[a]

Years from Degree	PERCENTILE SALARIES 10th	25th	Median	75th	90th	Mean Salary	Standard Deviation	Median Age	Total Number Known
			(in thousands of dollars)						
0–4	31.8	33.7	40.0	42.0	52.0	41.0	10.7	34	26
5–9	34.0	38.4	41.6	47.5	51.4	42.8	7.9	38	51
10–14	41.0	42.7	47.8	53.0	58.3	49.0	8.9	41	68
15–19	42.6	47.0	53.3	60.0	66.3	53.3	8.9	46	73
20–24	48.9	52.0	57.0	63.6	68.7	57.5	7.8	50	47
25 +	52.0	59.2	67.8	68.6	68.8	63.4	7.9	59	68

[a] In addition, there was 13 postdoctorates with a median salary of $25,200.

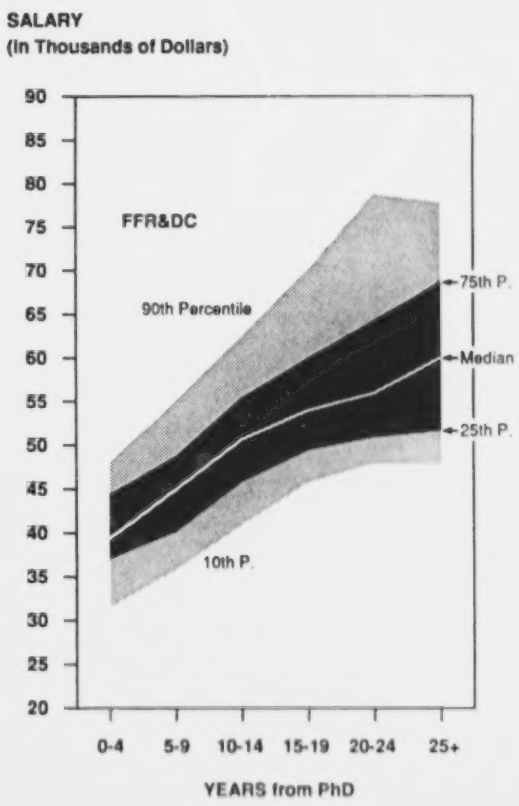


Figure 7. Salary structure in the national laboratories by years from PhD, 1985.

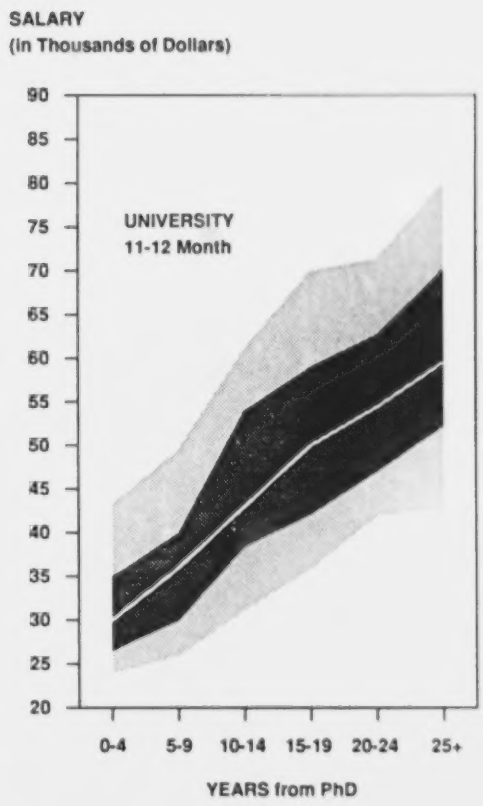


Figure 8. Salary structure in universities for 11–12 month salary base, by years from PhD, 1985.

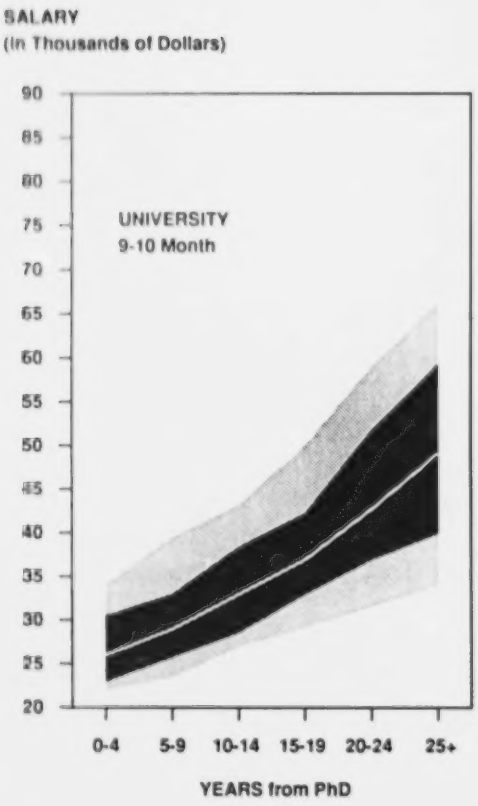


Figure 9. Salary structure in universities for 9–10 month salary base, by years from PhD, 1985.

• Salaries climb with professional experience. In contrast to the relatively stable academic salary range across experience levels, industrial salary ranges broaden with experience. This reflects the multiple research and administrative paths available in industry. The high salaries commanded by those engaged in administration, as well as the self-employed, pushed the top salaries of industrial scientists with twenty-five or more years of experience past the $100,000 mark.

• Salary ranges in the national laboratories, which remain relatively stable during the early career stages, expand sharply after fifteen years of experience. This is in large part due to administrators whose median yearly earnings exceed $76,000.

• The typical 9–10 month university salaries have a relatively narrow range across experience levels. In contrast, the 11–12 month salary ranges are both broader and more variable. This reflects a diversity of academic positions including non-tenure line research staff, administrative personnel and professors with federal grant-based salaries.

Table 10. 1985 FFR&DC salary structure by years from degree, PhDs.[a]

Years from Degree	PERCENTILE SALARIES 10th	25th	Median (in thousands of dollars)	75th	90th	Mean Salary	Standard Deviation	Median Age	Total Number Known
0–4	31.6	37.1	39.4	44.5	48.0	40.2	5.6	32	36
5–9	35.9	40.2	45.0	48.8	55.0	45.0	6.9	36	69
10–14	41.0	45.9	50.7	55.5	62.4	51.6	10.0	41	89
15–19	45.8	49.5	54.0	60.0	70.0	55.7	10.4	44	88
20–24	48.0	51.0	56.0	64.3	78.8	59.4	11.4	49	46
25 +	48.0	51.7	60.0	68.7	77.8	62.2	15.1	58	75

[a] In addition, there were 22 postdoctorates with a median salary of $26,600.

Table 11. 1985 university 11–12 month salary structure by years from degree, PhDs.[a]

Years from Degree	PERCENTILE SALARIES 10th	25th	Median (in thousands of dollars)	75th	90th	Mean Salary	Standard Deviation	Median Age	Total Number Known
0–4	24.0	26.5	30.0	35.0	43.2	31.4	8.9	32	40
5–9	26.0	30.0	36.0	40.0	49.5	37.1	10.1	36	92
10–14	31.2	38.4	43.0	54.0	61.1	45.6	12.3	40	76
15–19	35.9	42.1	50.0	59.0	70.0	51.4	15.8	45	94
20–24	42.0	47.0	54.4	62.7	71.4	55.5	12.7	50	64
25 +	42.8	52.2	59.5	70.1	80.0	61.1	13.8	58	88

[a] In addition, there are 76 postdocs in the 0–4 years from degree group with known salaries working in universities on an 11–12 month salary base. Their median salary is $21,100.

Table 12. 1985 university 9–10 month salary structure by years from degree, PhDs.[a]

Years from Degree	PERCENTILE SALARIES 10th	25th	Median (in thousands of dollars)	75th	90th	Mean Salary	Standard Deviation	Median Age	Total Number Known
0–4	22.0	23.0	26.0	30.5	34.0	26.8	4.6	32	55
5–9	23.5	25.8	29.0	33.0	39.5	30.9	8.4	36	85
10–14	27.0	28.6	33.0	38.4	43.2	34.1	7.1	41	96
15–19	29.2	33.0	37.0	42.3	50.0	38.8	9.6	45	163
20–24	31.6	37.0	42.8	51.8	59.0	44.2	10.4	50	166
25 +	34.0	40.0	49.1	59.2	66.2	49.8	12.6	59	256

[a] Postdocs excluded

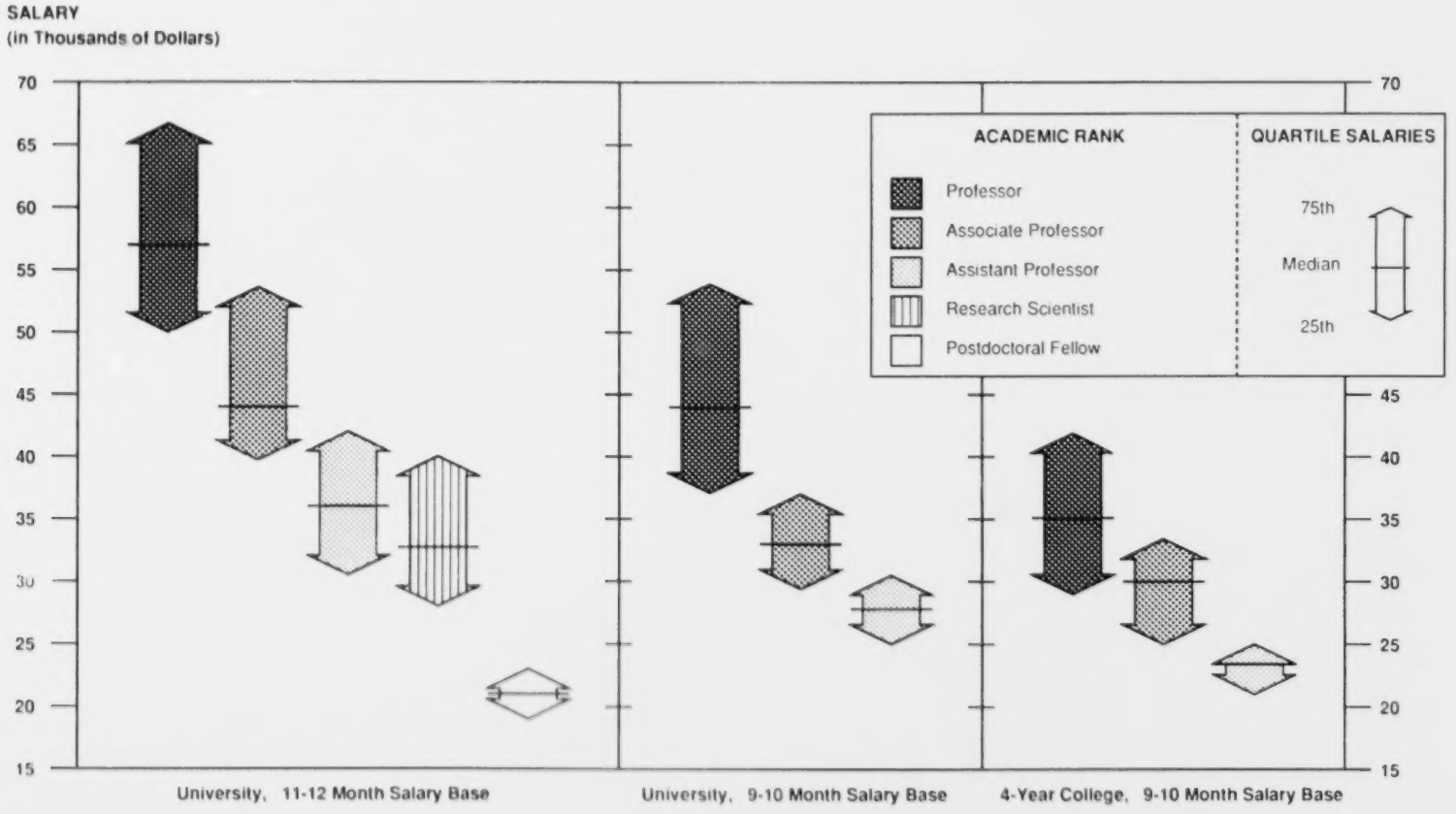


Figure 10. University and 4-year college salaries for PhDs by academic rank, 1985.

Salaries and Academic Rank

- Over the last three years, the salaries at universities and 4-year colleges have shown a steady 7% increase per year. This is nearly twice the rate of inflation (3½–4% per year since 1982) and, thus, represents a real increase in take-home pay for the academically employed. These increases are also slightly higher than those reported nationally for each academic rank by the American Association of University Professors.

- University professoriate salaries on a 11–12 month base exhibit a very wide range, reflecting the prevalence of research grant-based salaries.

- University associate professors also have a wide salary range. Most of the associate professors who are in the upper quartile of the salary distribution work in medical physics or are employed by a university medical center.

- Between 1984 and 1985, the median salary paid to postdoctoral fellows finally showed a significant increase, jumping about 8%. This one year change is almost as large as the salary increases over the preceding three years combined.

Table 13. 1985 university salaries by selected academic rank and salary base, PhDs.

	QUARTILE SALARIES (in thousands of dollars)			Mean Salary	Standard Deviation	Median Age	Total Number Known
	25th	Median	75th				
Professor							
9–10 month salary	37.1	44.0	53.9	46.2	11.8	52	543
11–12 month salary	50.0	57.0	66.7	58.5	12.8	52	180
Associate Professor							
9–10 month salary	29.4	33.0	37.0	33.5	6.2	44	144
11–12 month salary	39.7	44.0	53.6	48.3	16.3	42	74
Assistant Professor							
9–10 month salary	25.0	27.8	30.5	27.9	4.3	34	120
11–12 month salary	30.5	36.0	42.0	37.0	9.2	35	62
Research Associate (11–12 month salary)							
Postdoctorates	19.0	21.0	23.0	21.0	3.5	31	81
Other Research Staff	28.0	32.7	40.0	35.7	10.4	39	62

Table 14. 1985 4-year college salaries by selected academic rank on 9–10 month salary base, PhDs.

	QUARTILE SALARIES (in thousands of dollars)			Mean Salary	Standard Deviation	Median Age	Total Number Known
	25th	Median	75th				
Professor	29.0	35.1	41.9	35.0	7.7	49	71
Associate Professor	25.0	30.0	33.4	29.8	5.6	45	43
Assistant Professor	21.0	23.4	25.0	23.8	3.5	34	34

- Research scientist salaries are close to assistant professors on 11–12 month salary base. However, the ages of these non-tenured staff are closer to associate professors.

- The aging of the university professoriate, noted in previous reports, continues to be a major concern. Over 60% of the society members who hold a professorial rank in a university are full professors, whose median age as a group has climbed to 52 from 49 in 1981. This top-heavy age structure results in comparatively few entry-level positions and, consequently, only 1 in 6 professors are at the assistant professor rank.

- Salaries earned by members employed in 4-year colleges are 10–20% lower at each professorial rank than those earned by their colleagues in universities on a 9–10 month salary base.

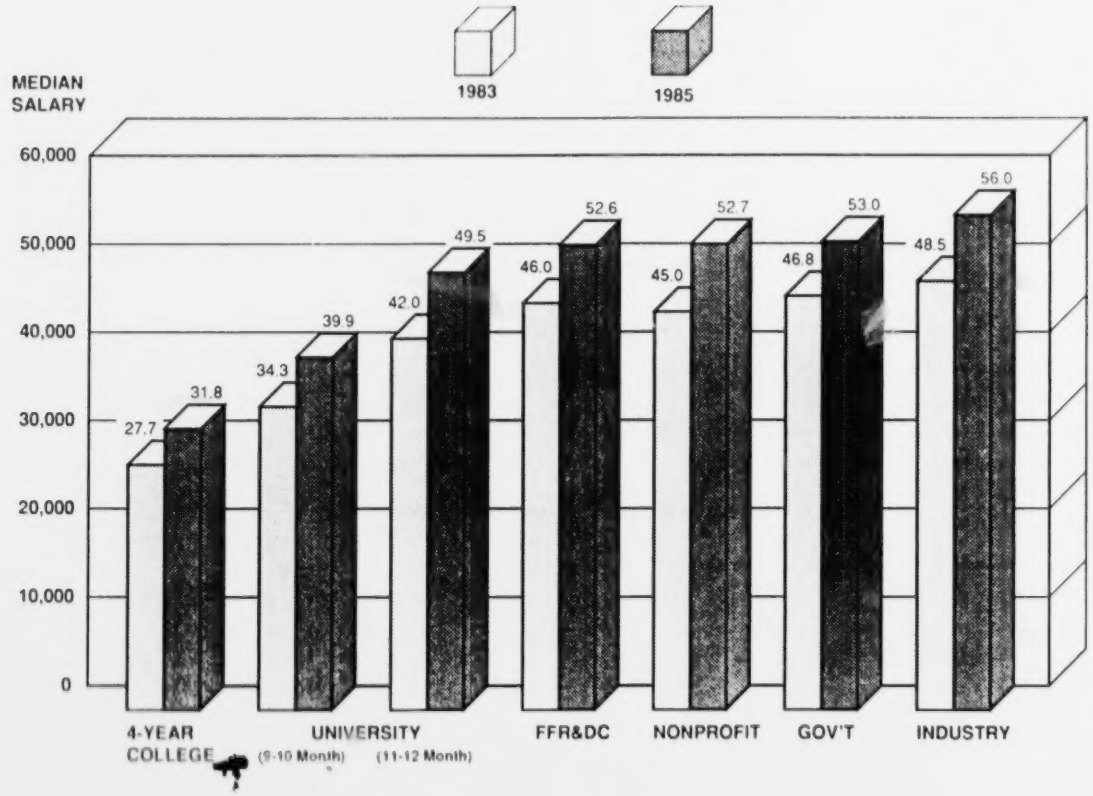


Figure 11. 1983 and 1985 median salaries by employment sector for PhDs remaining with the same employer.

Salary Increases and Employment Sector, 1983–1985.

- Median salaries for PhDs who remained with the same employer from 1983 to 1985 showed increases in the 14–18% range, nearly double the 8.7% inflation rate over that two-year period.

- Despite the fact that the inflation rate declined between 1983 and 1985, PhDs in universities received salary increases comparable to those of the preceding two years. However, industrial salaries and those in the national laboratories have begun to show a small compression. It is likely that with the inflation rate's continued decline to about 3% a year since 1985, the size of salary increments reported in the future will adjust downward in most employment sectors.

- PhDs employed in 4-year colleges earned the lowest salary levels. With these institutions fighting against declining enrollments, the PhDs in this sector also received among the lowest salary increases, about 15% over the two years.

Table 15. 1983 and 1985 salaries for members continuing with the same employer within selected employment sectors, PhDs.

	Year	Median Salary	Mean Salary (in thousands of dollars)	Standard Deviation	Median Age in 1985	Total Number Known
University						
9–10 month salary	1983	34.3	35.9	9.8		
	1985	39.9	42.1	12.4	49	558
11–12 month salary	1983	42.0	42.7	14.0		
	1985	49.5	49.6	15.4	46	313
4-Year College						
9–10 month salary	1983	27.7	27.9	6.6		
	1985	31.8	32.4	7.5	45	101
Industry	1983	48.5	51.4	14.8		
	1985	56.0	60.0	19.6	43	602
Government	1983	46.8	48.2	10.4		
	1985	53.0	54.2	10.6	46	244
FFR&DC	1983	46.0	46.8	10.5		
	1985	52.6	54.6	12.9	44	299
Hospital & Nonprofit	1983	45.0	47.0	14.0		
	1985	52.7	55.0	16.8	47	79

[a] Data based on society members who responded in both 1983 and 1985, were full-time employed, and did not change employers in the years 1983–85.

Salary Increases within Universities, 1983–1985.

- Society members who were employed in universities as full or associate professors and did not change their rank during the two years from 1983 to 1985, received salary increases in the 12–15% range. Research scientists employed in universities on soft money contracts also earned increases just under 15%.

- By comparison, society members at entry-level ranks in the universities fared much better over the same two year period. PhDs holding assistant professorships received salary increases of 20% and more between 1983 and 1985.

Salary Increases and Employer Changes, 1983–1985.

- The magnitude of the salary change for PhDs who changed employers between 1983 and 1985 reflects two phenomena: the individual's relative position within the salary structure of his or her 1983 employer and the overall differences in salary levels paid by the major employment sectors.

- Salary levels differ widely between the university and industrial sectors. PhDs who left universities and moved into industry were among the youngest of those who changed their employers and they literally doubled their salaries by taking industrial positions.

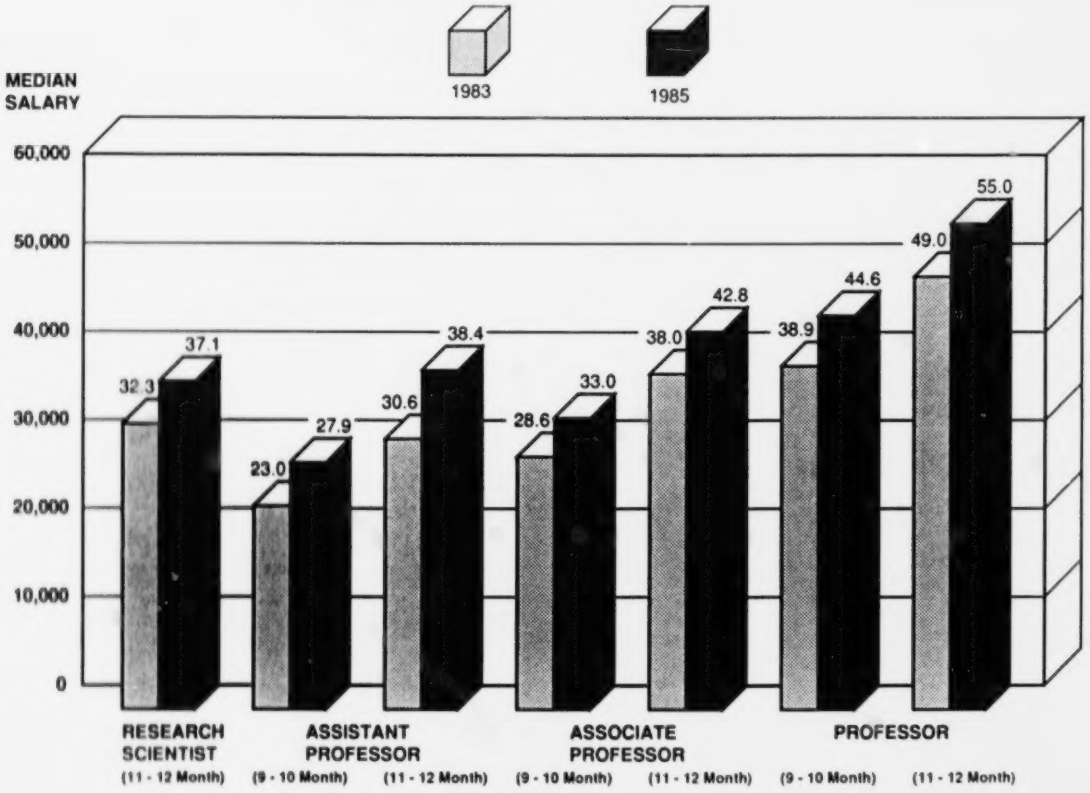


Figure 12. 1983 and 1985 median salaries by academic rank for PhDs remaining within the same rank.

- PhDs who changed employers within the university sector also tend to be young (below 40 years of age) and typically changed academic rank along with their employer. Consequently, their salary levels increased substantially between 1983 and 1985.

- PhDs who changed employers within industry, or moved from employment in government and the national laboratories into industry, earned 20% and more in 1985 compared to their salaries in 1983. In both cases, these increases were higher than those received by their colleagues who stayed with the same non-academic employer over the two-year period.

Table 16. 1983 and 1985 salaries for members continuing to work in the same university by academic rank, PhDs.

	Year	Median Salary	Mean Salary	Standard Deviation	Median Age in 1985	Total Number Known
		(in thousands of dollars)				
Full Professor	1983	38.9	40.2	8.7		
9–10 month salary	1985	44.6	46.9	11.8	53	367
Full Professor	1983	49.0	50.3	9.6		
11–12 month salary	1985	55.0	58.1	12.7	53	105
Associate Professor	1983	28.6	28.7	4.3		
9–10 month salary	1985	33.0	33.2	5.5	45	87
Associate Professor	1983	38.0	40.5	13.2		
11–12 month salary	1985	42.8	46.4	13.6	43	35
Assistant Professor	1983	23.0	24.0	3.6		
9–10 month salary	1985	27.9	28.2	4.0	37	49
Assistant Professor	1983	30.6	33.6	10.2		
11–12 month salary	1985	38.4	40.2	10.0	37	20
Research Staff (11–12 month salary)	1983	32.3	31.9	7.8		
(not Postdoctorates)	1985	37.1	38.3	10.4	41	32

Table 17. 1983 and 1985 salaries for members who changed employers during the two years, PhDs.

	Year	Median Salary	Mean Salary	Standard Deviation	Median Age in 1985	Total Number Known
		(in thousands of dollars)				
University (Postdoctorates)	1983	19.5	20.2	4.6		
University[a]	1985	30.6	31.3	7.1	33	21
University (not Postdoctorates)	1983	33.6	39.4	17.0		
University	1985	45.0	49.9	25.3	40	41
University	1983	21.4	24.8	8.3		
Industry	1985	43.7	46.6	18.4	35	33
Industry	1983	45.0	49.1	14.6		
Industry	1985	55.0	59.0	19.7	42	87
Government & FFR&DC	1983	44.1	46.1	18.9		
Industry	1985	55.0	61.3	31.8	44	20

[a] 4 of these PhDs were still postdocs in 1985.

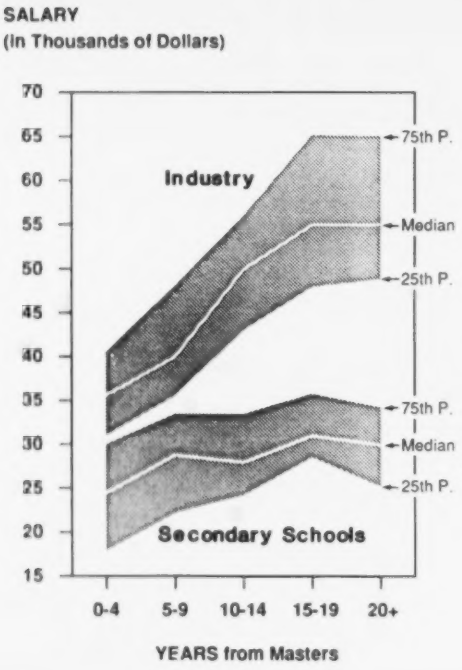


Figure 13. Salary structure in industry and secondary schools by years from Masters degree, 1985.

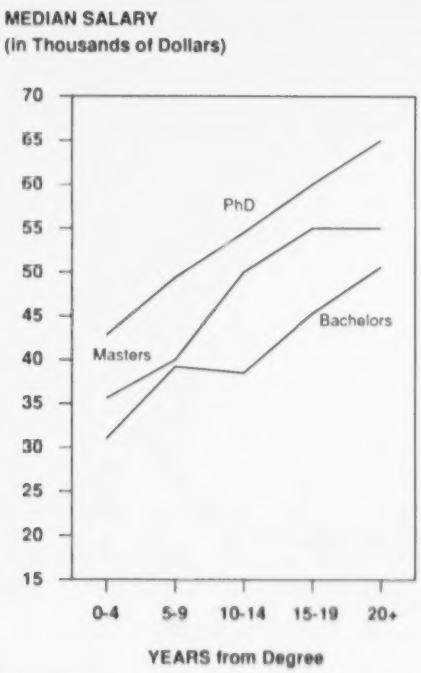


Figure 14. Median salaries in industry by degree level and years from degree, 1985.

SALARIES FOR MASTERS AND BACHELORS

• Society members who hold masters degrees are chiefly employed by industry (41%) or secondary schools (17%). Three-quarters of the society members who work in secondary schools hold masters degrees.

• Among the sectors that employ a large number of masters, high schools pay the lowest with a median salary of $30,000. By contrast, industry, government and the national laboratories pay their masters a median of $45,000 or better. Masters in hospitals earn a somewhat lower median salary ($40,000) but have, as a group, been in the labor market 5–10 years less than their colleagues in other sectors.

• Secondary school teachers' salaries are beginning to make significant headway, particularly at the entry level. Median salaries for masters degree holders with less than 10 years of experience have increased 8–10% per year for the last two years. Salaries increased less at the advanced experience levels as the ceiling for high school teachers edged up to about $35,000.

• It should be noted that comparatively few high school teachers in physics and related sciences have less than 10 years of experience. It will be important to see whether the increases in entry level salaries have an appreciable effect on recruiting more teachers into this profession.

Table 18. 1985 salaries by selected employment sector, Masters.

	Median Salary	Mean Salary (in thousands of dollars)	Standard Deviation	Median Age	Total Number Known
Junior College	33.0	32.4	5.7	49	55
Secondary School Teachers	30.0	28.7	7.2	46	131
Industry/Self-Employed	48.9	51.2	22.5	42	341
Government	44.9	45.9	11.6	46	88
FFR&DC	42.5	42.5	13.4	43	36
Hospital	40.0	43.5	15.0	37	49

Table 19. 1985 salaries by selected employment sector and years from degree, Masters.

	Years from Degree	QUARTILE SALARIES 25th	Median (in thousands of dollars)	75th	Mean Salary	Standard Deviation	Median Age	Total Number Known
Secondary School (Teachers only)	0–4	18.0	23.3	30.0	23.3	7.8	36	14
	5–9	22.3	28.8	33.4	27.5	8.2	40	16
	10–14	24.5	28.0	33.0	28.5	6.2	44	27
	15–19	28.6	31.0	35.7	31.4	6.2	46	37
	20 +	25.3	30.0	34.2	28.7	7.4	55	36
Industry/Self-Employed	0–4	31.1	35.6	40.5	37.5	13.6	30	50
	5–9	35.6	40.0	48.0	42.1	10.6	33	78
	10–14	43.1	50.0	56.0	52.3	19.8	38	44
	15–19	48.0	55.0	65.1	59.6	31.2	43	44
	20 +	48.9	55.0	65.0	59.5	23.7	56	120

Table 20. 1985 industrial salaries by years from degree, Bachelors.

	Median Salary	Mean Salary (in thousands of dollars)	Standard Deviation	Median Age	Total Number Known
0–4	31.0	31.9	6.4	26	31
5–9	39.2	39.9	9.8	30	53
10–14	38.5	40.8	12.6	35	35
15–19	45.3	50.5	22.8	41	23
20 +	50.6	56.7	22.4	56	100

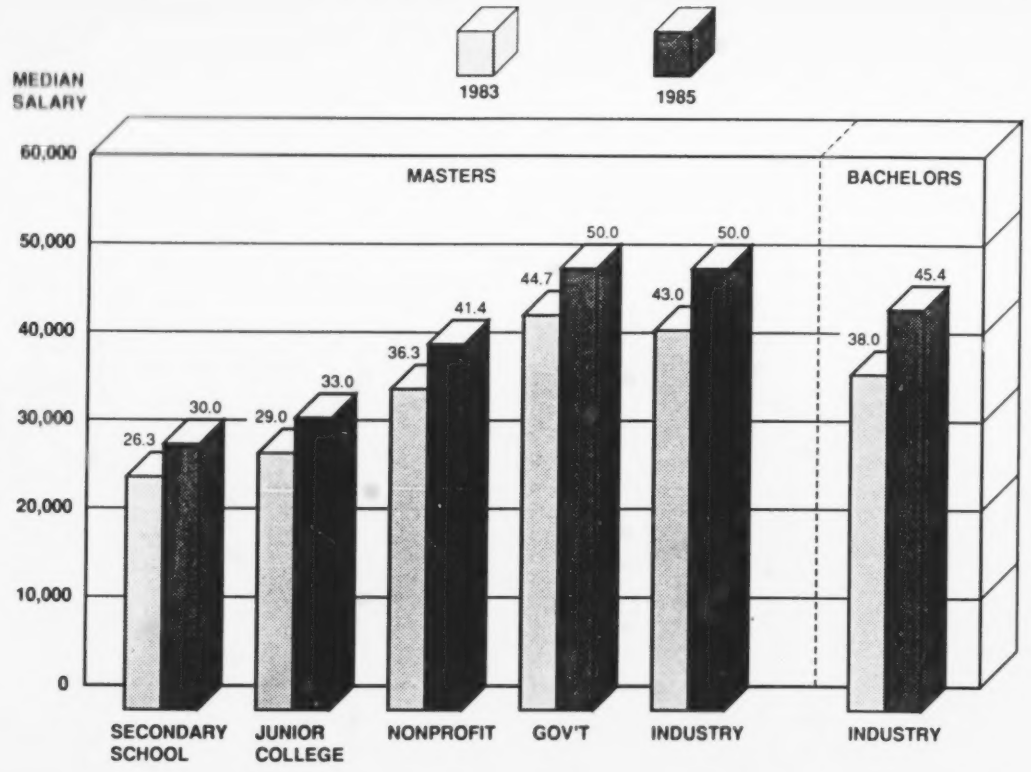


Figure 15. 1983 and 1985 median salaries by employment sector for Masters and Bachelors remaining with the same employer.

- Despite the size of the salary increase for high school teachers, industrially employed masters still get paid substantially more. In fact, the median entry level salary for masters in industry is $35,000, which is as much as the most experienced high school teachers currently earn.

- Two-thirds of all society members who hold a bachelors degree are employed in industry. Another 9% each teach in the high schools or work for the government.

Table 21. 1983 and 1985 salaries for members continuing with the same employer within selected employment sectors, Masters and Bachelors.

	Year	Median Salary	Mean Salary (in thousands of dollars)	Standard Deviation	Median Age in 1985	Total Number Known
Masters						
Secondary School	1983	26.3	26.0	6.0		
(Teachers only)	1985	30.0	30.0	6.9	48	87
Junior College	1983	29.0	28.0	5.2		
	1985	33.0	32.4	5.2	48	34
Industry	1983	43.0	45.1	16.1		
	1985	50.0	53.5	26.6	46	168
Government	1983	44.7	44.9	9.7		
	1985	50.0	50.4	10.2	48	58
Hospital & Nonprofit	1983	36.3	37.6	9.4		
	1985	41.4	44.1	14.7	40	31
Bachelors						
Industry	1983	38.0	43.1	24.0		
	1985	45.4	49.0	18.6	48	119

- Changes in median salary for bachelors and masters who stayed with the same employer from March 1983 to March 1985 vary according to employment sector. Masters employed with the government received the lowest percentage salary increase, however this was nearly double the inflation rate for that period.

- Among the lower degree holders, those employed in industry earned the largest salary increases between 1983 and 1985. During that period median salaries for bachelors and masters increased 16 and 19%, respectively.

- At all levels of professional experience, industrially employed PhDs receive higher salaries than their colleagues with lower degrees. Salaries for masters and bachelors in industry are comparatively close the first ten years after receipt of the degree. However, salaries then diverge with additional professional experience.

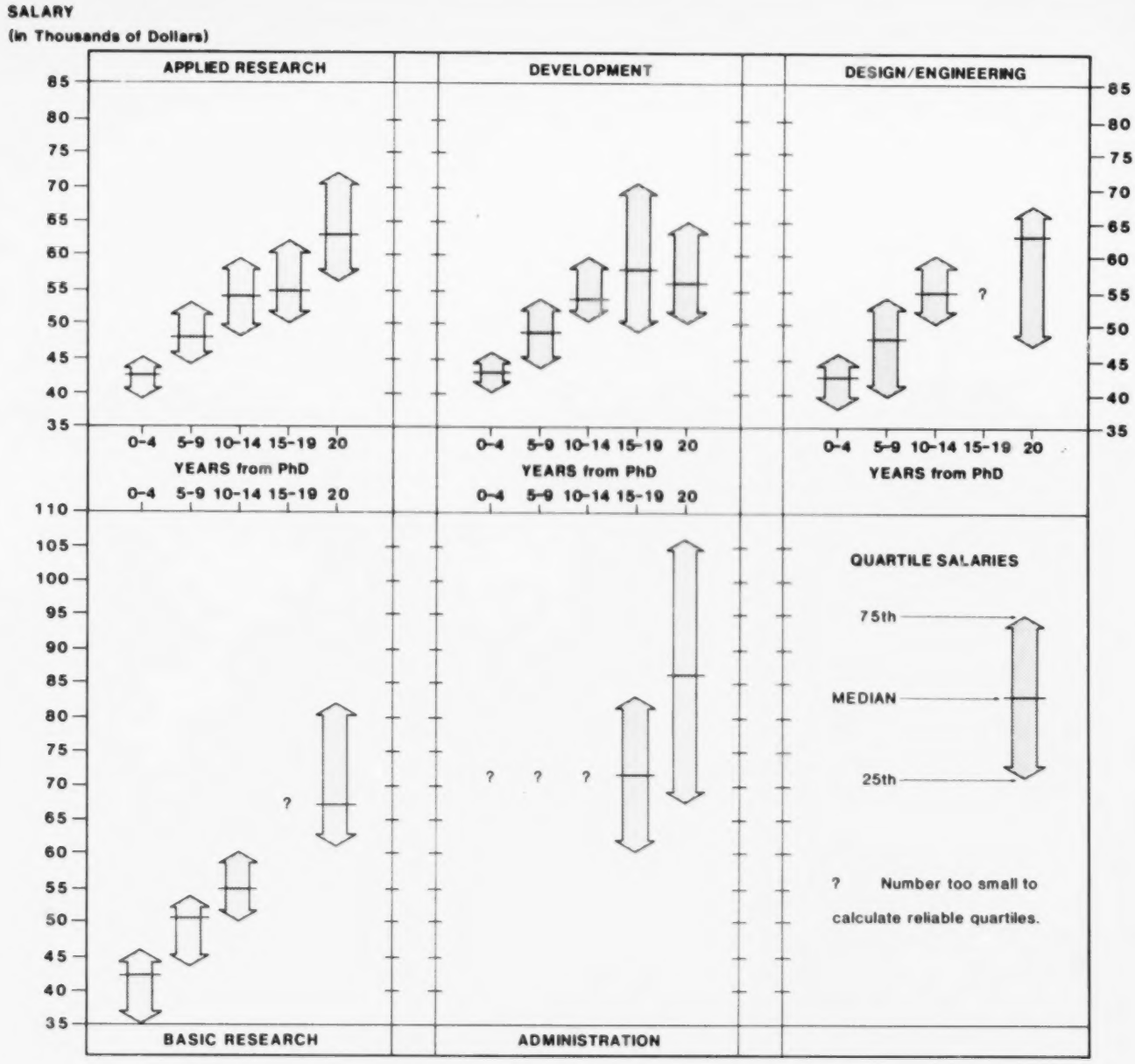


Figure 16. Industrial salaries by primary work activity and years from PhD, 1985.

Table 22. 1985 Industrial salaries by primary work activity and years from degree, PhDs.

Years from Degree	QUARTILE SALARIES 25th	Median (in thousands of dollars)	75th	Mean Salary	Standard Deviation	Median Age	Total Number Known
Basic Research							
0–4	35.0	42.0	46.0	42.9	11.1	31	30
5–9	43.5	50.7	54.0	50.4	9.0	34	30
10–14	50.0	55.0	60.0	55.8	9.2	39	24
15–19	*	*	*	*	*	*	*
20 +	60.9	67.0	82.0	72.9	19.1	55	31
Applied Research							
0–4	39.0	42.4	45.2	42.6	6.6	31	92
5–9	44.0	48.0	53.0	48.9	7.3	36	103
10–14	48.0	54.0	59.5	55.4	12.6	41	78
15–19	49.9	55.0	62.1	58.6	15.5	45	60
20 +	56.3	63.0	72.0	65.8	15.0	56	78
Development							
0–4	40.0	42.9	45.9	43.5	5.7	32	30
5–9	43.6	48.8	53.7	49.3	8.5	36	41
10–14	50.0	53.4	59.7	54.3	8.4	43	40
15–19	48.6	58.0	70.5	68.1	37.3	45	29
20 +	50.0	56.0	65.0	58.3	13.1	56	39
Design/Engineering							
0–4	37.6	42.3	45.9	42.9	8.8	33	21
5–9	39.5	48.0	54.0	47.6	8.4	35	29
10–14	50.0	55.0	60.0	56.4	12.3	40	21
15–19	*	*	*	*	*	*	*
20 +	46.9	63.0	67.5	59.9	16.1	53	23
Administration							
0–4	*	*	*	*	*	*	*
5–9	*	*	*	*	*	*	*
10–14	*	*	*	*	*	*	*
15–19	60.0	71.6	83.2	72.4	15.5	44	38
20 +	67.5	86.0	106.0	89.6	33.9	56	55

**Number of respondents was too small to calculate reliable statistics.*

SALARIES AND PRIMARY WORK ACTIVITY

• Median PhD starting salaries in industry, ranging from $42,000 to $43,000, are relatively consistent across work activities. Those engaged in non-administrative activities maintain comparable salary levels throughout their careers, while scientists shifting into administration profit by earning well over 20% more than those remaining outside administration.

• Individuals in industry typically move into administration later in their careers; 42% of all administrators have 20 years or more experience. Scientists working in applied research or design/engineering are most likely to make this move. Those doing basic research are least likely.

Table 23. 1983 and 1985 salaries for members continuing in the same primary work activity, PhDs.

	Year	Median Salary	Mean Salary	Standard Deviation	Median Age in 1985	Total Number Known
		(in thousands of dollars)				
Teaching	1983	31.8	33.2	9.4		
	1985	36.8	38.6	11.2	48	574
Basic Research	1983	39.4	40.0	13.3		
	1985	46.7	47.6	14.9	43	764
Applied Research	1983	44.5	45.5	10.8		
	1985	51.0	53.3	12.6	43	517
Development	1983	45.0	46.3	11.1		
	1985	51.0	54.3	17.6	44	132
Design/Engineering	1983	46.0	47.6	12.0		
	1985	54.0	55.6	12.9	40	66
Administration	1983	55.4	57.8	17.0		
	1985	63.6	67.1	22.8	50	242

- Between 1983 and 1985, salary increases for society members across all work activities remained comfortably ahead of inflation. Percentage increases were largest for PhD scientists engaged in basic research or design/engineering, masters level scientists working in design/engineering, and bachelors degree holders involved in teaching.

- At all degree levels, administrators reported among the smallest percentage salary increases, yet they continue to earn considerably more than their non-administrative peers. At the bachelors degree level, for example, teachers earned an 18% salary increase between 1983 and 1985 while administrators earned only 9%. Yet teachers reported a median salary in 1985 of $23,500, less than half the median salary of $56,000 paid to administrators.

- Caution should be taken when interpreting salary data for lower degree holders. The relatively small number of nonstudent masters and bachelors who belong to AIP Member Societies may not be representative of all lower degree holders with physics or related science and engineering backgrounds.

Table 24. 1983 and 1985 salaries for members continuing in the same primary work activity, Masters.

	Year	Median Salary	Mean Salary	Standard Deviation	Median Age in 1985	Total Number Known
		(in thousands of dollars)				
Teaching	1983	27.0	26.7	6.0		
	1985	30.8	30.6	6.6	49	156
Applied Research	1983	43.0	44.6	14.7		
	1985	49.4	51.2	16.1	49	64
Development	1983	41.8	41.5	8.3		
	1985	47.2	47.6	10.2	44	64
Design/Engineering	1983	38.0	39.3	11.2		
	1985	44.7	46.3	12.9	40	58
Administration	1983	49.0	50.8	18.9		
	1985	54.7	62.0	38.9	52	60

Table 25. 1983 and 1985 salaries for members continuing in the same primary work activity, Bachelors.

	Year	Median Salary	Mean Salary	Standard Deviation	Median Age in 1985	Total Number Known
		(in thousands of dollars)				
Teaching	1983	20.0	20.3	4.7		
	1985	23.5	23.6	5.7	39	24
Applied Research	1983	38.0	37.7	10.7		
	1985	43.3	44.2	12.2	50	37
Development	1983	39.6	42.2	15.6		
	1985	43.0	48.5	17.7	47	31
Design/Engineering	1983	35.9	38.2	10.7		
	1985	41.0	45.3	11.7	48	44
Administration	1983	53.2	58.7	35.0		
	1985	58.0	63.0	22.8	54	38

Table 26. 1985 industrial salaries by sex and years from degree.

Years from Degree	Median Salary	Mean Salary (in thousands of dollars)	Standard Deviation	Median Age	Total Number Known
0–4					
Male	40.7	41.1	10.3	31	237
Female	39.5	38.1	10.6	32	30
5–9					
Male	46.7	47.0	10.6	35	346
Female	42.0	43.8	12.1	34	25
10 +					
Male	57.0	61.0	23.0	48	977
Female	45.0	47.3	17.4	41	25

Table 27. 1983 and 1985 salaries by sex and major employment sector.

	Year		Median Salary	Mean Salary (in thousands of dollars)	Standard Deviation	Median Age in 1985	Total Number Known
Academic	1983	Male	32.9	35.1	11.8		
		Female	27.8	29.1	10.5		
	1985	Male	38.8	41.5	14.5	47	1370
		Female	34.5	34.1	11.2	46	76
Nonacademic	1983	Male	45.4	47.5	14.6		
		Female	40.0	39.5	11.3		
	1985	Male	52.0	55.3	17.9	44	1762
		Female	47.1	47.2	13.5	39	90

SALARIES FOR MALES AND FEMALES

• In 1985 men continued to earn higher salaries than women, although the disparity has been steadily decreasing. Using the longitudinal sample, we can examine the changing salaries of men and women who continued to be full-time employed during the early 1980's. In 1981, women's salaries lagged behind men's by 25% in academe and 16% outside academe. Since that time, women have consistently received proportionally larger salary increases than their male colleagues, decreasing this gap in 1985 to 12% and 10%, respectively.

• In industry, the disparity between the salary levels of men and women increases with experience. At entry-level, women earn on the average only 3% less then men, while at the most experienced level the gap grows to 27%. This reflects, in part, the varying male and female age distributions. At the most senior level of experience women are considerably younger than men, while at less experienced levels women's median age is on par with men. The difference in salary level at the most experienced level is also rooted in the differing career paths taken by male and female scientists. Women are less likely than men to be engaged in such lucrative work activities as administration.

APPENDIX A: GEOGRAPHIC DIVISIONS

NEW ENGLAND
Connecticut
Maine
Massachusetts
New Hampshire
Rhode Island
Vermont

MIDDLE ATLANTIC
New Jersey
New York
Pennsylvania

SOUTH ATLANTIC
Delaware
District of Columbia
Florida
Georgia
Maryland
North Carolina
South Carolina
Virginia
West Virginia
Puerto Rico

EAST NORTH CENTRAL
Illinois
Indiana
Michigan
Ohio
Wisconsin

EAST SOUTH CENTRAL
Alabama
Kentucky
Mississippi
Tennessee

WEST NORTH CENTRAL
Iowa
Kansas
Minnesota
Missouri
Nebraska
North Dakota
South Dakota

WEST SOUTH CENTRAL
Arkansas
Louisiana
Oklahoma
Texas

MOUNTAIN
Arizona
Colorado
Idaho
Montana
Nevada
New Mexico
Utah
Wyoming

PACIFIC
Alaska
California
Hawaii
Oregon
Washington

APPENDIX B: TECHNICAL NOTES

Median

The median, a measure that is frequently used in this report, is that point in a distribution above and below which 50% of the values fall. Since it is less influenced by extreme values than the arithmetic mean, it is the preferred descriptive measure of central tendency in typically skewed salary and age distributions. In most of the tables, both median and mean salaries are presented; observed differences reflect the skewness in the distributions.

Quantile Calculations

The P-STAT statistical package was used to compute the medians and other quantiles presented in the salary tables and figures. It should be noted that this package works with an ordered distribution of value points. In such an ordered distribution, the median, for example, equals the central point in an odd-numbered distribution and a weighted value between the two middle points in an even-number distribution.

Quantiles and Interquantile Ranges

Ninety percent of the values in a distribution fall below the ninth decile, seventy-five percent below the third quartile, twenty-five percent below the first quartile and ten percent below the first decile. The interdecile and interquartile ranges, which indicate differences between deciles and between quartiles, are measures of variation within distributions and are used in several of this report's figures.

Employment Base

Salary data are presented for current society members who are employed full-time in the U.S. Some separate but limited information on Canadian residents is also provided. Students are not included.

Sampling Error

The salary figures in this report may be affected by different sources of error. Society members who did not respond may have had somewhat different salaries than those who did respond, thus introducing response bias. Although earlier surveys in this series estimated that the effects of response bias were minor, the possible effect remains. A fuller explanation of response bias is presented in the methodological appendices of the membership profiles.

Since the data in this report are based upon a small random sample, they are also subject to sampling error. The variability introduced by the sampling procedure depends both on the size of the sub-group being examined, and the variation of values in the population. The formulas below present conservative estimates of the standard error based on simple random sampling. When standard errors were calculated, taking into account the minor stratification by society used in the sampling, slightly lower estimates resulted. Confidence intervals for proportions, means and medians can be determined as follows:

Medians:

M_1, that point below which p_1^{th} values fall,
M_2, that point below which p_2^{th} values fall,

where

$$p_1 = p + Z\left(\frac{p(1-p)}{n}\right)^{1/2}, \; p_2 = p - Z\left(\frac{p(1-p)}{n}\right)^{1/2}.$$

and

$p = 0.5$,
n = sample size,
z = coefficient of confidence, 1.96 at the 95% confidence level.

Means:

$\bar{x} \pm Zs/(n)^{1/2}$, *where*

$\bar{x}$ = the arithmetic mean,
s = standard deviation,
n = sample size, and
Z = coefficient of confidence 1.96 at the 95% confidence level.

Proportions:

$$p \pm Z\left(\frac{p(1-p)}{n}\right)^{1/2}$$

p = sample proportion observed.
n = sample size, and
Z = coefficient of confidence, 1.96 at the 95% confidence level.

Standardization

In one analytic section of this report standardization techniques were used to control on related variables that effect salary levels. To examine directly the impact of regional variation on salaries, variation in employer type was controlled. Employer-adjusted average salaries for each region were calculated by applying the nationwide employer distribution to the employer-specific mean salaries within each region.

Cost of Living Index

The cost of living index used in this report was developed by the American Chamber of Commerce Researchers' Association (ACCRA). Its purpose is to provide "a useful and reasonably accurate measurement of inter-city cost of living differences." The index measures "relative price levels for consumer goods and services in participating cities, as compared with the national average for all participating cities (metropolitan and nonmetropolitan)." Differences of more than three index whole numbers in the All-items index can be considered to represent actual inter-city differences in the cost of consumer goods and services; but the percentage difference in such cases should be considered a reasonable indication, rather than a precise measure, of the extent of the differences.